

# Algebra Practice Test: 1

For Grade-8, 9 and 10 students

(Time: 30 minutes)

1. If  $x + y = 3$  &  $xy = 2$ , then find the value of  $(x - y)^2$
2. Express the following as difference of two square terms:  
 $(4a + 3b)(2a - 3b)$
3. If  $a - b = 3$  &  $ab = 10$ , then find  $(a + b)^2$
4. If  $x + \frac{1}{x} = 3$ , Find the value of  $\frac{x}{x^2 + x + 1}$
5. Multiply:  
 $(x^2 + x + 1), (x^2 - x + 1), (x^4 - x^2 + 1)$  using algebraic formula  $a^2 - b^2 = (a + b)(a - b)$
6.  $a + b + c = 5, a^2 + b^2 + c^2 = 13$ , Find the value of  $ab + bc + ca$
7.  $x - y = 4$ , Find the value of  $x^3 - y^3 - 12xy$
8.  $a = b + c$ , Prove that  $a^3 - b^3 - c^3 = 3abc$
9.  $x = 3^{\frac{1}{3}} - 3^{-\frac{1}{3}}$ , Prove that  $3x^3 + 9x = 8$
10. Express the following as difference of two squares:  
 $(x + 7)(x + 9)(x + 11)(x + 13)$

## ANSWERS

1. 1
2.  $(3a)^2 - (a + 3b)^2$
3. 49
4.  $\frac{1}{4}$
5.  $x^8 + x^4 + 1$
6. 6
7. 64
10.  $(x^2 + 20x + 95)^2 - 4^2$

## Algebra Practice Test: 2

For Grade-8, 9 and 10 students

Time: 30 minutes

1. Use algebraic formulae to evaluate the following expressions:
  - i.  $9a^2 + 24ab + 16b^2$ , when  $a = 2, b = 3$
  - ii.  $25a^2 + 16b^2 - 40ab$ , when  $a = 2, b = -1$
2. Evaluate the following:
  - i.  $a^2 + b^2$ , when  $a + b = 7$  and  $ab = 20$
  - ii.  $a + b$ , when  $a^2 + b^2 = 9$  and  $ab = 20$
3. Express the following as difference of two squares:  
 $x(2x + 1)(x - 2)(2x - 3) - 63$
4. Find the value of  $m^2 + \frac{1}{m^2}$ , when  $m - \frac{1}{m} = 4$
5. Find the value of  $m^3 - \frac{1}{m^3}$ , when  $m - \frac{1}{m} = p$
6. Find the value of  $m^4 + \frac{1}{m^4}$ , when  $m + \frac{1}{m} = 3$
7. Find the value of  $m^3 + \frac{1}{m^3}$ , when  $m + \frac{1}{m} = 4$
8. Find the value of  $m^3 + \frac{1}{m^3}$ , when  $\left(m + \frac{1}{m}\right)^2 = 3$
9. Find the value of  $x^4 + y^4 - 2x^2y^2$ , when  $x = a + \frac{1}{a}$ ,  $y = a - \frac{1}{a}$
10. If  $bx = ay$ , prove that  $(x^2 + y^2)(a^2 + b^2) = (ax + by)^2$

### ANSWERS

1. 324,196
2. 9,  $\pm 7$
3.  $(2x^2 - 3x - 1)^2 - 8^2$
4. 18
5.  $p^3 + 3p$
6. 47

- 7. 52
- 8. 0
- 9. 16

## Algebra Practice Test: 3

For Grade-8, 9 and 10 students

Time: 30 minutes

1. If  $a + b + c = 0$ , prove that  $a^3 + b^3 + c^3 = 3abc$
2. Multiply  $(a^4 + a^2b^2 + b^4)$  and  $(a^2 - b^2)$  using algebraic formulae
3. If  $2x - \frac{2}{x} = 3$ , prove that  $x^2 + \frac{1}{x^2} + 3 = 7\frac{1}{4}$
4. If  $a = x + y$ ,  $b = x - y$ ,  $c = x + 2y$ , then find the value of  $a^2 + b^2 + c^2 - ab - bc - ca$
5. If  $a + b + c = 5$ ,  $a^2 + b^2 + c^2 = 13$  Find the value of  $ab + bc + ca$
6. If  $x + y = 6$ ,  $xy = 8$  Find the value of  $x^3 + y^3 + 4(x - y)^2$
7. If  $x = \sqrt{3} - \frac{1}{\sqrt{3}}$ , and  $y = \sqrt{3} + \frac{1}{\sqrt{3}}$ , prove that  $\frac{x^2}{y} + \frac{y^2}{x} = 3\sqrt{3}$
8. Simplify:  $(a + b)^3 - 3(a + b)^2(a - b) + 3(a + b)(a - b)^2 - (a - b)^3$
9. If  $a + \frac{1}{a} = 2$ , Find the value of  $a^4 + \frac{1}{a^4}$
10. If  $x + \frac{1}{x} = \sqrt{3}$ , then prove that  $x^3 + \frac{1}{x^3} = 0$

### ANSWERS

2.  $a^6 - b^6$
4.  $7y^2$
5. 6
6. 88
8.  $8b^3$
9. 2

## Algebra Practice Test: 4

For Grade-8, 9 and 10 students

Time: 30 minutes

1. If  $a + b + c = 0$ , prove that  $a(b + c)^2 + b(c + a)^2 + c(a + b)^2 = 3abc$
2. If  $x = b - c$ ,  $y = c - a$  and  $z = a - b$  Find the value of  $x^2 + y^2 - z^2 + 2xy$
3. If  $\left(a - \frac{1}{a}\right)^2 = 3$ , prove that  $a^6 + \frac{1}{a^6} = 110$
4. If  $x + y = a$ ,  $x^2 + y^2 = b^2$  and  $x^3 + y^3 = c^3$  prove that  $a^3 + 2c^3 = 3ab^2$
5. If  $x = 2 + 2^{1/3} + 2^{2/3}$  prove that  $x^3 - 6x^2 + 6x - 2 = 0$
6. If  $a + b + c = 6$ ,  $ab + bc + ca = 11$ ,  
Find the value of  $bc(b + c) + ca(c + a) + ab(a + b) + 3abc$
7. If  $a = x + y$ ,  $b = x - y$  and  $c = x + 2y$ ,  
Find the value of  $a^2 + b^2 + c^2 - ab - bc - ca$
8. If  $x + y + z = 2$ ,  $xy + yz + zx = 1$  then find the value of  $(x + y)^2 + (y + z)^2 + (z + x)^2$
9. If  $a + b + c = 0$ , prove that  $a^3 + b^3 + c^3 = 3abc$
10. If  $p = 3 + \frac{1}{p}$ , prove that  $p^4 = 119 - \frac{1}{p^4}$

### ANSWERS

2. 0
6. 66
7.  $7y^2$
8. 6

## Algebra Practice Test: 5

For Grade-8, 9 and 10 students

Time: 30 minutes

1. If  $x + y = 4$  and  $\frac{1}{x} + \frac{1}{y} = 4$ , Find the value of  $x^3 + y^3$
2. Express  $(x+1)(x+2)(x+6)(x+7) + (x+4)^2$  as a square term.
3. If  $ax + by = p$ ,  $bx - ay = q$ ,  $a^2 + b^2 = 1$ , Prove that  $x^2 + y^2 = p^2 + q^2$
4. If  $x^4 + \frac{1}{x^4} = 119$ , Find the value of  $x^3 - \frac{1}{x^3}$
5. Simplify using formulae:  $(3a + 2b)^2 - (2a + b)^2$
6. If  $a + \frac{1}{a} = 2$ , prove that  $a^3 + \frac{1}{a^3} = 2$
7. If  $a + b + c = 9$ ,  $ab + bc + ca = 26$  and  $a^3 + b^3 + c^3 = 138$ , Find the value of  $abc$
8. Factorize:  $(x+1)(x+3)(x-4)(x-6) + 24$
9. If  $2x - \frac{2}{x} = 3$ , Prove that  $8\left(x^3 - \frac{1}{x^3}\right) = 63$
10. If  $x + y = \sqrt{3}$ ,  $x - y = \sqrt{2}$  Find the value of  $8xy(x^2 + y^2)$

### ANSWERS

1. 52
2.  $(x^2 + 8x + 10)^2$
4. 36
5.  $5a^2 + 8ab + 3b^2$
7. 37
8.  $(x^2 - 3x - 6)(x^2 - 3x - 16)$
10. 5

## Algebra Practice Test: 6

For Grade-8, 9 and 10 students

Time: 30 minutes

1. If  $a + b + c = 0$ , prove that  $a^2 - bc = b^2 - ca = c^2 - ab$
2. If  $3(a^2 + b^2 + c^2) = (a + b + c)^2$ , prove that  $a = b = c$
3. If  $a - \frac{1}{2a} = 2$ , prove that  $a^3 - \frac{1}{8a^3} = 11$
4. If  $x + y + z = 6$  and  $xy + yz + zx = 9$ , prove that  $\frac{1}{1-x} + \frac{1}{1-y} + \frac{1}{1-z} = 0$
5. If  $xy(x + y) = 1$ , prove that  $\frac{1}{x^3 y^3} - x^3 - y^3 = 3$
6. If  $(x + y) = 6$ ,  $xy = 5$ , Find the value of  $x^2 \left( \frac{x^2}{y} + y \right) + y^2 \left( \frac{y^2}{x} + x \right)$
7. Express  $(x + 2y)(x + 3y)$  as difference of two squares.
8. If  $a + b + c = 2$ ,  $ab + bc + ca = 1$ , Find the value of  $(a + b)^2 + (b + c)^2 + (c + a)^2$
9. If  $a - b = 1$ ,  $a + b = \sqrt{3}$ , Find the value of  $a^4 - b^4$
10. If  $u = x + \frac{1}{x}$ , show that  $x^4 + \frac{1}{x^4} = u^4 - 4u^2 + 2$

### ANSWERS

6. 655.2
7.  $\left\{ \frac{1}{2}(2x + 5y) \right\}^2 - \left( \frac{1}{2}y \right)^2$
8. 6
9.  $2\sqrt{3}$

## Algebra Practice Test: 7

For Grade-8, 9 and 10 students

Time: 30 minutes

1. Find out  $a, b$  when  $a^2 + b^2 = 58$  and  $ab = 21$
2. If  $x + y + z = a$ ,  $x^2 + y^2 + z^2 = b$  Find the value of  $yz + zx + xy$
3. If  $a + b + c = 8$ ,  $a^2 + b^2 + c^2 = 30$  Find the value of  $a^3 + b^3 + c^3 - 3abc$
4. Simplify:  $(a + b - c)^2 - (a - b + c)^2$
5. If  $a + 2b = 3$ ,  $ab = 2$ , Find the value  $a^2 + 4b^2$
6. If  $x + \frac{1}{x} = 5$ , Find the value of  $x^3 + \frac{1}{x^3}$
7. If  $x = -7$ , prove that  $x^3 + 15x^2 + 75x + 225 = 92$  (use formulas)
8. If  $x = b - c$ ,  $y = c - a$ ,  $z = a - b$ , Prove that  $x^2 - y^2 + z^2 + 2zx = 0$
9. If  $x + y = 1 + xy$ , show that  $x^3 + y^3 = 1 + x^3y^3$
10. If  $x = \sqrt[3]{5} + 2$ , prove that  $x^3 - 6x^2 + 12x - 13 = 0$

### ANSWERS

1.  $a = 7, b = 3; a = 3, b = 7; a = -7, b = -3; a = -3, b = -7$
2.  $\frac{1}{2}(a^2 - b)$
3. 104
4.  $4a(b - c)$
5. 1
6. 110



## Algebra Practice Test: 8

For Grade-8, 9 and 10 students

Time: 30 minutes

1. Simplify  $(a + b - c + d)^2 - (a - b + c - d)^2$
2. If  $x - \frac{1}{x} = -3$ , then find the value of  $x^4 + \frac{1}{x^4}$
3. Express  $8x^3 + 36x^2y + 54xy^2 + 27y^3$  as cube of sum of two terms i.e. in  $(P + Q)^3$  form.
4. If  $x + y = 5$ ,  $xy = 7$  then prove that  $x^3 + y^3 + 4(x - y)^2 = 8$
5. If  $\left(a + \frac{1}{a}\right)^2 = 3$ , then prove that  $a^3 + \frac{1}{a^3} = 0$
6. Prove that  $(2x - 1)^3 - (x - 2)^3 - 3(2x - 1)(x - 2)(x + 1) = (x + 1)^3$
7. If  $a - b = 2$ ,  $ab = 1$ , find the value of  $(a^2 + b^2)(a^3 - b^3)$
8. If  $a + b = 1$ , prove that  $(a^2 - b^2)^2 = a^3 + b^3 - ab$
9. If  $a^2 + b^2 + c^2 = 9$  and  $ab + bc + ca = 8$ , Find the value of  $(a + b + c)$
10. If  $x - y = 4z$ , then find the value of  $x^3 - y^3 - 12xyz$

### ANSWERS

1.  $4a(b - c + d)$
2. 119
3.  $(2x + 3y)^3$
7. 84
9.  $\pm 5$
10.  $64z^3$

## Algebra Practice Test: 9

For Grade-8, 9 and 10 students

Time: 30 minutes

1. If  $x = b + c - a$ ,  $y = c + a - b$ ,  $z = a + b - c$ , show that  
$$x^3 + y^3 + z^3 - 3xyz = 4(a^3 + b^3 + c^3 - 3abc)$$
2. If  $x = y + z$ , show that  $x^3 - y^3 - z^3 = 3xyz$
3. Simplify:  $(x + 4)(x^2 - 4x + 16) - (x + 3)(x^2 - 3x + 9)$
4. If  $x + \frac{1}{x} = -1$ , prove that  $x^3 + \frac{1}{x^3} = 2$
5. If  $\left(x - \frac{1}{x}\right)^2 = 3$ , find the value of  $x^3 + \frac{1}{x^3}$
6. If  $a + b + c = 15$ ,  $a^2 + b^2 + c^2 = 77$ , then find the value of  $ab + bc + ca$
7. If  $\left(a^{\frac{1}{3}} + b^{\frac{1}{3}} + c^{\frac{1}{3}}\right) = 0$  and  $abc = 1$ , find the value of  $a + b + c$
8. Simplify:  $(y^2 - z^2)(y^2 + z^2) + (z^2 - x^2)(z^2 + x^2) + (x^2 - y^2)(x^2 + y^2)$
9. If  $x + y = 4$ , Find the value of  $x^3 + y^3 + 12xy$
10. Express  $x(x - 3)(x - 6)(x - 9) + 81$  as a square term.

### ANSWERS

3. 37
5.  $4\sqrt{7}$
6. 74
7. 3
8. 0
9. 64
10.  $(x^2 - 9x + 9)^2$

# Algebra Practice Test: 10

For Grade-8, 9 and 10 students

Time: 30 minutes

1. Factorize:  $(x+1)(x+3)(x+5)(x+7)+15$
2. Simplify:  $(x+y+z)(x-y+z)(x+y-z)(z+y-x)$
3. If  $p + \frac{1}{4p} = -2$  Find the value of  $p^2 + \frac{1}{16p^2}$
4. If  $x = a + \frac{1}{a}$ ,  $y = a - \frac{1}{a}$ , Find the value of  $x^4 + y^4 - 2x^2y^2$
5. If  $a + b = 3$ ,  $ab = 2$ , Find the value of  $a^3 + b^3$
6. Express  $(x+1)(x+3)(x-5)(x-7)$  as difference of two squares.
7. Express  $(a+2)(2a+1)(5a+2) - 3a^4$  as difference of two squares.
8. Factorize:  $(x^2 - 1)(x+2)x - 8$
9. If  $\left(x - \frac{1}{x}\right)^2 = 3$ , then find the value of  $x^6 + \frac{1}{x^6}$
10. Factorize:  $(x+1)(x+2)(3x-1)(3x-4)+12$

## ANSWERS

1.  $(x+2)(x+6)(x^2 + 8x + 10)$
2.  $2x^2y^2 + 2y^2z^2 + 2z^2x^2 - x^4 - y^4 - z^4$
3. 2
4. 16
5. 9
6.  $(x^2 - 4x - 13)^2 - 8^2$
7.  $(a^2 + x)^2 - (2a^2)^2$
8.  $(x^2 + x + 2)(x^2 + x - 4)$
9. 110
10.  $(x-1)(3x+5)(3x^2 + 2x - 4)$

# Algebra Practice Test: 11

For Grade-8, 9 and 10 students

Time: 30 minutes

1. Express  $(x-a)(x-b)$  as difference of two squares.
2. Factorize:  $(x-1)(x-2)(x-3)(x-4)-3$
3. Express  $(2x+1)(2x+3)(2x+5)(2x+7)+212$  as sum of two squares.
4. If  $a+\frac{1}{b}=1$ ,  $b+\frac{1}{c}=1$ , show that  $c+\frac{1}{a}=1$
5. If  $a+b=1$ , show that  $a^2+b^2=a^3+b^3+ab$
6. If  $p+\frac{1}{p}=q$ , Find the value of  $p^2+\frac{1}{p^2}$
7. If  $4x-\frac{4}{x}=3$ , Find the value of  $x^2+\frac{1}{x^2}+\frac{7}{16}$
8. If  $a-\frac{1}{a}=4$ , Find the value of  $a^3-\frac{1}{a^3}+24$

## ANSWERS

1.  $\left(\frac{2x-a-b}{2}\right)^2 - \left(\frac{b-a}{2}\right)^2$
2.  $(x^2-5x+3)(x^2-5x+7)$
3.  $(4x^2+16x+11)^2+14^2$
6.  $q^2-2$
7. 3
8. 100

# Algebra Practice Test: 12

For Grade-8, 9 and 10 students

Time: 30 minutes

Factorize the following expressions:

1.  $a^2 - b^2 - c^2 + d^2 - 2(ad - bc)$
2.  $a^3 + a^2 + a + 1$
3.  $63x^3 + 9x^2 - 27x + 27$
4.  $81x^4 + 4y^4$
5.  $(a^2 - b^2)(x^2 + y^2) + 2(a^2 + b^2)xy$
6.  $(x - a)^2 - 4(x - b)^2$
7.  $20x^2 - 45b^4$
8.  $x^2 - y^2 + 2x + 1$
9.  $ac - bd + bc - ad$
10.  $x^2 - 4x - y^2 + 2y + 3$

## ANSWERS

1.  $(a + b - c - d)(a - b + c - d)$
2.  $(a + 1)(a^2 + 1)$
3.  $9(x + 1)(7x^2 - 6x + 3)$
4.  $(9x^2 + 2y^2 + 6xy)(9x^2 + 2y^2 - 6xy)$
5.  $(ax + ay + bx - by)(ax + ay - bx + by)$
6.  $(3x - a - 2b)(2b - a - x)$
7.  $5(2x + 3b^2)(2x - 3b^2)$
8.  $(x + y + 1)(x - y + 1)$
9.  $(a + b)(c - d)$
10.  $(a + b - c - d)(a - b + c - d)$

# Algebra Practice Test: 13

For Grade-8, 9 and 10 students

Time: 30 minutes

Factorize the following expressions:

1.  $a^2 - b^2 + 4bc - 4c^2$
2.  $a^2 - 2bc - b^2 + 6ac + 8c^2$
3.  $a^4 - 7a^2b^2 + b^4$
4.  $4a^2 - 4ab + 2bc - c^2$
5.  $2x^6 - 16y^6$
6.  $x^2(x + y) - xy(x + y)$
7.  $x^3 - y^3 + 3y^2 - 3y + 1$
8.  $4x^4 + 81$
9.  $3a^3b - 12ab^3$
10.  $x^4 + 4y^4$

## ANSWERS

1.  $(a + b - 2c)(a - b + 2c)$
2.  $(a + b + 4c)(a - b + 2c)$
3.  $(a^2 + b^2 + 3ab)(a^2 + b^2 - 3ab)$
4.  $(2a - c)(2a - 2b + c)$
5.  $2(x^2 - 2y^2)(x^4 + 2x^2y^2 + 4y^4)$
6.  $x(x + y)(x - y)$
7.  $(x - y + 1)(x^2 + y^2 + 1 + xy - x - 2y)$
8.  $(2x^2 + 6x + 9)(2x^2 - 6x + 9)$
9.  $3ab(a + 2b)(a - 2b)$
10.  $(x^2 + 2xy + 2y^2)(x^2 - 2xy + 2y^2)$

# Algebra Practice Test: 14

For Grade-8, 9 and 10 students

Time: 30 minutes

Factorize the following expressions:

1.  $4x^2 - 4xy - 2yz - z^2$
2.  $9x^2 - 6x + 1$
3.  $x^3 - y^3 + xy(x - y)$
4.  $16a^2 - 9(x - y)^2$
5.  $x^4 + 2x^3 - x^2 - 2x + 1$
6.  $x^2 - 4y^2 + 2x + 1$
7.  $8a^3 + 27b^3$
8.  $a^6 - b^6$
9.  $8(x + y)^3 - z^3$
10.  $x^4 - 3x^2 + 1$

## ANSWERS

1.  $(2x + z)(2x - 2y - z)$
2.  $(3x - 1)(3x - 1)$
3.  $(x - y)(x + y)(x + y)$
4.  $(4a + 3x - 3y)(4a - 3x + 3y)$
5.  $(x^2 + x - 1)(x^2 + x - 1)$
6.  $(x + 2y + 1)(x - 2y + 1)$
7.  $(2a + 3b)(4a^2 - 6ab + 9b^2)$
8.  $(a + b)(a - b)(a^2 + ab + b^2)(a^2 - ab + b^2)$
9.  $(2x + 2y - z)(4x^2 + 4y^2 + z^2 + 8xy + 2yz + 2xz)$
10.  $(x^2 + x - 1)(x^2 - x - 1)$

# Algebra Practice Test: 15

For Grade-8, 9 and 10 students

Time: 30 minutes

Factorize the following expressions:

1.  $x^4 + 4x^2 + 4$
2.  $a^3 + 3a^2 + 18a + 54$
3.  $x^4 + 64$
4.  $a^4 + 2a^2 + 9$
5.  $x^2 - 4(y^2 - x - 1)$
6.  $x(x - 4) - y(y - 4)$
7.  $x^2 - y^2 - 6xa + 2ya + 8a^2$
8.  $a^2 + 2a - b^2 + 2b$
9.  $2x^4 - 8x^2 + 8$
10.  $3a^2 + b^2 - c^2 - 4ab + 2ac$

## ANSWERS

1.  $(x^2 + 2)(x^2 + 2)$
2.  $(a + 3)(a^2 + 18)$
3.  $(x^2 + 4x + 8)(x^2 - 4x + 8)$
4.  $(a^2 + 2a + 3)(a^2 - 2a + 3)$
5.  $(x + 2y + 2)(x - 2y + 2)$
6.  $(x + y - 4)(x - y)$
7.  $(x + y - 4a)(x - y - 2a)$
8.  $(a + b)(a - b + 2)$
9.  $2(x^2 - 2)(x^2 - 2)$
10.  $(3a - b - c)(a - b + c)$



# Algebra Practice Test: 16

For Grade-8, 9 and 10 students

Time: 30 minutes

Factorize the following expressions:

1.  $(a + b - 3c)^2 - a - b + 3c$
2.  $9a^2 - 25b^2$
3.  $4(a + b)^2 - 9(a - b)^2$
4.  $4x^2 - 9y^2 - 4xz + 6yz$
5.  $a^2 - b^2 - c^2 + d^2 + 2(bc + ad)$
6.  $x^4 + x^2y^2 + y^4$
7.  $a^2 - x^2 + 2xy - y^2$
8.  $(a - b)^2 - (2b - c)^2$
9.  $a^4 - 16c^2 + 8bc - b^2$
10.  $a^4 - 9a^2 + 30a - 25$

## ANSWERS

1.  $(a + b - 3c)(a + b - 3c - 1)$
2.  $(3a + 5b)(3a - 5b)$
3.  $(5a - b)(5b - a)$
4.  $(2x + 3y - 2z)(2x - 3y)$
5.  $(a + b - c + d)(a - b + c + d)$
6.  $(x^2 + xy + y^2)(x^2 - xy + y^2)$
7.  $(a + x - y)(a - x + y)$
8.  $(a + b - c)(a - 3b + c)$
9.  $(a^2 - b + 4c)(a^2 + b - 4c)$
10.  $(a^2 + 3a - 5)(a^2 - 3a + 5)$

# Algebra Practice Test: 17

For Grade 9 and 10 Students

Time: 30 mins

1. If  $x + \frac{1}{x} = 2$ , Find the value of  $\frac{x}{1+x+x^2}$
2. If  $x + \frac{1}{x} = 2$ , Find the value of  $x - \frac{1}{x}$
3. If  $x - \frac{1}{x} = 0$ , Find the value of  $x^8 + \frac{1}{x^8}$
4. If  $a + b = 5$  and  $a - b = 1$ , Find the value of  $8ab(a^2 + b^2)$
5. If  $x = b - c$ ,  $y = c - a$ ,  $z = a - b$ , then find the value of  $x^2 - y^2 + z^2 + 2xz$
6. Find the value of  $1.79 \times 1.79 + 2.42 \times 1.79 + 1.21 \times 1.21$
7. Express  $(x - 1)(x - 3)(x - 4)(x - 6) + 34$  as the sum of two squares.
8. Express  $x(x - 3)(x - 6)(x - 9) + 81$  as a perfect square.
9. Express  $(a^2 + b^2)(c^2 + d^2)$  as the sum of two squares.
10. Express  $ab$  as the difference of two squares.

## ANSWERS

1.  $\frac{1}{3}$
2. 0
3. 2
4. 624
5. 0
6. 9
7.  $(x^2 - 7x + 9)^2 + 5^2$
8.  $(x^2 - 9x + 9)^2$
9.  $(ac + bd)^2 + (ad - bc)^2$
10.  $\left(\frac{a+b}{2}\right)^2 + \left(\frac{a-b}{2}\right)^2$

# Algebra Practice Test: 18

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Time: 30 mins

1. If  $2x - \frac{2}{x} = 3$ , prove that  $8\left(x^3 - \frac{1}{x^3}\right) = 63$
2. If  $\left(a + \frac{1}{a}\right)^2 = 3$ , prove that  $a^3 + \frac{1}{a^3} = 0$
3. If  $a + b = 5$  and  $ab = 6$ , find the value of  $4(a^2 - b^2) - a^3 + b^3$ , if  $a > b$
4. If  $p = 3 + \frac{1}{p}$ , prove that  $p^4 = 119 - \frac{1}{p^4}$
5. Simplify:  $(2m + 3n)^3 + (2m - 3n)^3 + 12m(4m^2 - 9n^2)$
6. If  $x + y = a$ ,  $x^2 + y^2 = b^2$ ,  $x^3 + y^3 = c^3$ , prove that  $a^3 + 2c^3 = 3ab^2$
7. If  $a^2 + b^2 = c^2$ , show that  $a^6 + b^6 + 3a^2b^2c^2 = c^6$
8. If  $x = a + \frac{1}{a}$ , and  $y = a - \frac{1}{a}$ , find the value of  $x^4 - 2x^2y^2 + y^4$
9. If  $xy(x + y) = 1$ , find the value of  $\frac{1}{x^3y^3} - x^3 - y^3$
10. If  $x + \frac{1}{x} = 3$ , find the value of  $x^5 + \frac{1}{x^5}$

## ANSWERS

3. 1
5.  $64m^3$
8. 16
9. 3
10. 123